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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,053	08/28/2006	Peter Geskes	016906-0463	7572
23428 7590 12/11/2009 FOLEY AND LARDNER LLP SUITE 500 3000 K STREET NW WASHINGTON, DC 20007				
EXAMINER				
MCKINNON, TERRELL L				
ART UNIT		PAPER NUMBER		
3744				
MAIL DATE		DELIVERY MODE		
12/11/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/566,053

Applicant(s)

GESKES ET AL.

Examiner

TERRELL L. MCKINNON

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/IC)
Paper No(s)/Mail Date 2/1/2006, 2/19/2008, 12/23/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Claim Objections

Claim 5 is objected to because of the following informalities: Applicant's claim 5 is not number. Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 8 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The subject matter of claim 8 is not supported in the specification. Page 4 lines 11-20, is the only location in the disclosure that remotely mentions the dimensions of the profile depth. However, the claimed limitations do not have support.

Claim 8 will be treated on the merits in this Office Action.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a

question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 7 recites the broad recitation 45 to 135 degrees, and the claim also recites 90 degrees which is the narrower statement of the range/limitation.

5. In the present instance, claim 8 recites the broad recitation 0.3 mm and 2 mm, and the claim also recites 0.5 mm and 1 mm, then 0.7 mm and 0.8 mm which are the narrower statement of the range/limitation.

6. In the present instance, claim 8 recites the broad recitation 0.6 mm and 2 mm, and the claim also recites 1.5 mm which is the narrower statement of the range/limitation.

7. In the present instance, claim 9 recites the broad recitation 8 mm to 15 mm, and the claim also recites 9 mm to 12 mm which is the narrower statement of the range/limitation.

8. In the present instance, claim 24 recites the broad recitation 25% to 15%, and the claim also recites 10% which is the narrower statement of the range/limitation.

9. In the present instance, claim 25 recites the broad recitation 1 mm and 4 mm, and the claim also recites 1 mm and 2 mm, also 1.4 mm which is the narrower statement of the range/limitation.

10. In the present instance, claim 27 recites the broad recitation 4 to 7 per cm², and the claim also recites 5 to 6 per cm² which is the narrower statement of the range/limitation.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 10-12, 14, 17-19, 21, 23, 26, 28-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Daikin Industries LTD (EP 1070928).

Daikins LTD discloses a plate type heat exchanger comprising:

Re. claim 1, Daikins discloses (referring to paragraph 40 of column 7, paragraph 64 of column 11 and fig. 1): A plate-type heat exchanger for motor vehicles, the heat exchanger being formed from heat transfer plates P1, P2, alternately piled between two frames 2, 3 and integrally joined together by brazing; the plates cavities which are closed off outwardly being formed between and through which a first and a second medium flow A, B alternately in each case via at least one inflow line and outflow line, the plates being profiled in such a way that, between the respective profiles of the plates, contact points occur, in the region of which the plates are fastened to one another, wherein the profiles of the plates and their contact points are designed in such

a way that the flow, formed between the plates, of the first and the second medium A, B from the corresponding inflow line to the corresponding out-flow line runs as "zigzag".

Re. Claim 10, Daikins discloses (referring to paragraph 43 of column 8): each of the heat transfer plates P1, P2 is form, of a substantially rectangular plate made of metal (such as stainless steel or aluminum) and has heat transfer enhancement surfaces formed by press working on its surfaces. The limitation plates being coated on at least one side with soldering aid material, is a very well known technique when joining hard surfaces together for bond, considering Daikins disclosure of joining plates together by brazing in claim 1.

Re. Claim 11, Daikins discloses the plates have as inflow lines and outflow lines in each case a pair of bores perpendicularly with respect to the plate plane, the bores being raised with respect to the basic plane in such a way that there is a fluidic connection from one of the two bores alternately only to every second plate interspace", which has been disclosed (referring to paragraph 55-59 of column 10 and figs. 2-3, 5-6).

Re. Claim 12, Daikins discloses the raised region of at least some bores is surrounded by a region preferably leading around annularly and free of wavy profile (Fig. 7).

Re. Claim 13, Daikins discloses bores having distributor ducts defined by wavy profiles with a leg angle which is increased as compared with the leg angle of the wavy profile (Figs. 5-7)

Re. Claim 14, Daikins discloses the bores (21-24) assigned to the inflow lines are oval.

Re. Claim 17, Daikins discloses the wavy profiles of adjacent plates are identical to one another (Figs. 2 and 3).

Re. Claim 18, Daikins discloses the heat exchanger is formed from a stack of plates, the plates corresponding to one another and being arranged so as to be rotated alternately through 180[deg.] with respect to one another (referring to paragraph 44 of column 8): the first heat transfer plate P1 and the second heat transfer plate P2 are piled in a manner that the front face of one heat transfer plate is opposed to the back face of the other.

Re. Claim 19, Daikins discloses the plates have a bent edge, the edges of adjacent plates bearing one against the other and preferably being connected to one another by brazing paragraph 40, 43.

Re. Claim 21, Daikins discloses the wavy profile extends into the edge, in particular over the edge (figs. 2-3).

Re. Claim 23, Daikins discloses at least one end face of the heat exchanger is assigned a closing plate which is profileless, in particular, at least on the outside and which preferably has connection points for a first and second medium, said connection points issuing into connecting lines and being arranged in alignment with the bores (fig. 1).

Re. Claim 26, Daikins discloses the contact points between two plates adjacent to one another are distributed uniformly over the plate surface (paragraph 40 column 7, paragraph 64 column 11 and paragraph 44 column 8).

Re. Claim 28, Daikins discloses a phase transition of a medium takes place in plate interspaces (paragraph 65 of column 12).

Re. Claim 29, Daikins discloses the installation position of the heat exchanger is determined such that the transverse distribution of the medium in the plate interspaces is assisted by gravitation (Figs. 1, 8 and 10).

Re. Claim 30, Daikins discloses embossing the plates, stacking the plates one on the other and fastening them to one another by brazing (paragraph 40, 43 of column 8).

Re. Claim 31, Daikins discloses the heat exchanger is formed from a stack of plates, the plates corresponding to one another and being arranged so as to be rotated alternately through 180[deg.] with respect to one another (referring to paragraph 44 of column 8): the first heat transfer plate P1 and the second heat transfer plate P2 are piled in a manner that the front face of one heat transfer plate is opposed to the back face of the other.

Re. Claim 32, Daikins discloses brazing takes place wherein the plates are sealingly to one another at their edges, contact points of wavy profiles at the same time (paragraph 40 and 43).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2-4, 9, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daikins Industries LTD (EP 1070928) in view of Dahlgren (U.S. 5,531,269).

Re. Claim 2-4, Daikins's invention discloses all of the claimed limitations from above except for the plates having a recurring wavy profile in a zig-zag manner, the wavy profile has legs with length, leg angles between the legs, profile depth and regions of curvature.

However, Dahlgren teaches plates having a recurring wavy profile in a zig-zag manner the wavy profile has legs with length, leg angles between the legs, profile depth and regions of curvature (Fig. 2)

Given the teachings of Dahlgren, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Daikins with the plates having a recurring wavy profile in a zig-zag manner, the wavy profile has legs with length, leg angles between the legs, profile depth and regions of curvature.

Doing so would provide an increase heat transfer rate between the two fluids.

Re. Claim 9, Daikins fails to disclose the leg length in the range of 9 mm to 12 mm.

However, Dahlgren teaches adjusting and designing the plates wavy pattern (leg length) in such a way to meet the transfer needs of the heat exchanger (col. 2, lines 5-14). Wherein, it would have been obvious to one of ordinary skill in the art to have a leg length in the range of 9 mm to 12 mm, for the purpose of accommodating the heat transfer needs of heat exchanger.

Re Claim 15 and 16, Daikins fails to disclose wherein two plates, and/or wavy profile of one side of the plate, different from one another in terms of the wavy profile are used alternately, the wavy profiles differing from one another at least in terms of one of the features comprising leg length, leg angle and profile depth.

However, Dahlgren teaches plates having different pressing patterns and/or one plate having different patterns for providing proper heat transfer between two different fluids (Col. 1, lines 30-34 and Col. 4, lines 54-61).

Given the teachings of Dahlgren, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Daikins with the plates having wavy profile of one side of the plate, different from one another in terms of the wavy profile are used alternately, the wavy profiles differing from one another at least in terms of one of the features comprising leg length, leg angle and profile depth.

Doing so would provide an increase heat transfer rate between the two fluids.

Claims 5, 6 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daikins Industries LTD (EP 1070928) in view of Dahlgren (U.S. 5,531,269), as applied to claims above, and further in view of Wand (U.S. 5,462,113).

Re. Claims 5 and 6 Daikins's invention as modified by Dahlgren, discloses all of the claimed limitations from above except for the wavy profile has a flat region on the outside of the wavy back, wherein the flat region is between 0.1 mm and 0.4 mm in a cross-section of the wavy profile.

However, Wand teaches plates having a wavy profile with flat regions (Figs. 7, 9, 10 and 11)

Given the teachings of Wand, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the plate heat exchanger of Daikins with wavy profile has a flat region on the outside of the wavy back, wherein the flat region is between 0.1 mm and 0.4 mm in a cross-section of the wavy profile.

Doing so would provide reliable contact points between adjacent plates for facilitating heat transfer between the fluids.

Re. Claim 20, Daikins discloses the plates have a bent edge, the edges of adjacent plates bearing one against the other and preferably being connected to one another by brazing paragraph 40, 43. Daikins fails to disclose up to five mutually overlapping plates. However, it would have been an obvious design choice to have up to five stacked plates for the purpose of accommodating a given design requirement.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Daikins Industries LTD (EP 1070928) in view of ALFA-LAVAL Thermal (WO85/02670).

Re. Claim 7, Daikins fails to disclose the leg angle being between 45 and 135 degrees.

ALFA-LAVAL teaches the leg angle is preferably between 45 and 135 degrees, preferably around 90 degrees (referring to line 31 page 5 to line 3 of page 6 and fig. 2); the ridges and valleys in the primary heat exchange part of the plates 12 and 13 form an angle of about 120 degrees with the center line M on the other side.

Given the teachings of ALFA-LAVAL, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the plate heat exchanger of Daikins with the leg angle being between 45 and 135 degrees.

Doing so would provide an efficient fluid flow angle for exchanging heat between fluids.

Claims 8 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daikins Industries LTD (EP 1070928) in view of Joel et al. (U.S. 5,544,703).

Re. Claim 8, Daikins fails to disclose a profile depth also the profile depth between liquid and gaseous media.

However, Joel teaches a plate type heat exchanger wherein the profile depth is altered for different fluid regions (col. 2, lines 60-63).

Given the teachings of Joel, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the plate heat exchanger of Daikins with a profile depth, also the profile depth between liquid and gaseous media.

Doing so would provide the proper flow rate between the fluids for satisfying a given exchange property.

Re. Claim 22, Daikins fails to disclose between the end of the wavy profile and the edge, a profile-free bending portion is formed the width of which is smaller than 2 mm and is preferably determined in such a way that, during the brazing of the plates, the bending region is blocked with solder in wave crest portions in such way that a through flow of medium in the bending portion is reduced or essentially prevented.

However, Joel teaches between the end of the wavy profile and the edge, a profile-free bending portion is formed (col. 2, lines 36-45 and Figs. 5 and 6).

Given the teachings of Joel, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the plate heat exchanger of Daikins with the end of the wavy profile and the edge, a profile-free bending portion is formed the width of which is smaller than 2 mm and is preferably determined in such a way that, during the brazing of the plates, the bending region is blocked with solder in wave crest portions in such way that a through flow of medium in the bending portion is reduced or essentially prevented.

Doing so would provide a safe and reliable means of bonding transfer plates together to prevent leakage.

Claims 24, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daikins Industries LTD (EP 1070928) in view of Leuthner et al. (U.S. 7,040,387).

Re. Claim 24 and 25, Daikins fails to disclose hydraulic diameter percentages and average values of liquid and gaseous media.

However, Leuthner teaches adjusting hydraulic diameters to meet the heat transfer needs (col. 5, lines 15-16).

Given the teachings of Leuthner, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the plate heat exchanger of Daikins with hydraulic diameter percentages and average values of liquids and gaseous media.

Doing so would provide a heat absorbing or heat dissipating surface area for exchanging heat between fluids.

Re. Claim 27, Daikin discloses contact points between two plates (para. 40 of col. 7 and para. 64 of col. 11), but fails to disclose the contact points have a surface density of 4 to 7 per cm^2 . It would have been an obvious engineering design choice to one of ordinary skill in the art to have a surface density between 4 and 7 per cm^2 , for the purpose of satisfying a requirement for a particular outcome.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited on the PTO 892 discloses related limitations of the applicant's claimed and disclosed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TERRELL L. MCKINNON whose telephone number is (571)272-4797. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

December 7, 2009

/Terrell L Mckinnon/
Examiner, Art Unit 3744